

PENDING CLAIMS

The following is a complete list of claims currently pending in the present application.

Please cancel claims 1-42. Please add new claims 70-78.

1-42. (Cancelled)

43. (Withdrawn) A method for forming a patterned feature on a wafer surface, the method comprising:
- transmitting light through a phase shifting photomask onto photoresist covering the wafer surface;
 - forming an isolated first residual photoresist feature between a first wafer area exposed to light in a first phase and a second wafer area exposed to light in a second phase, wherein the first phase is substantially opposite the second phase, and
 - wherein the second wafer area entirely surrounds the first wafer area in the plane of the wafer; and
 - forming the patterned feature from the photoresist feature.
44. (Withdrawn) The method of claim 43 wherein the first phase is about zero degrees and the second phase is about 180 degrees.
45. (Withdrawn) The method of claim 44 wherein:
- the step of forming an isolated photoresist feature comprises developing photoresist, and
 - the step of forming the patterned feature comprises etching, and
 - the first residual photoresist feature defines a closed shape having a perimeter, and
 - after the developing step and before the etching step, no portion of the wafer surface is exposed within the perimeter.
46. (Withdrawn) The method of claim 45 wherein the shortest dimension of the photoresist feature measured in the plane of the wafer surface is no greater than about 150 nm.

47. (Withdrawn) The method of claim 44 further comprising forming a plurality of residual photoresist features,
wherein each photoresist feature of the plurality is exposed to light in the first phase, and each photoresist feature of the plurality is entirely surrounded by the second wafer area.
48. (Withdrawn) The method of claim 47 wherein each of the plurality of photoresist features defines a closed shape having a perimeter, and, after the developing step and before the etching step, no portion of the wafer surface is exposed within the perimeter.
49. (Withdrawn) The method of claim 48 wherein the plurality of photoresist features is uniformly spaced.
50. (Withdrawn) The method of claim 48 wherein the plurality of photoresist features is randomly spaced.
51. (Withdrawn) The method of claim 48 wherein a patterned feature is formed on the wafer surface from each of the plurality of photoresist features, and wherein the patterned features are portions of memory cells forming a first memory level in a memory array, the first memory level formed at a first height above a substrate.
52. (Withdrawn) The method of claim 51 wherein the memory array is a monolithic three dimensional memory array, the array further comprising at least a second memory level formed at a second height above the substrate, the second height different from the first height.
53. (Withdrawn) The method of claim 43 wherein the first phase is about 180 degrees and the second phase is about zero degrees.
54. (Withdrawn) The method of claim 53 wherein:
the step of forming an isolated photoresist feature comprises developing photoresist, and

the step of forming the patterned feature comprises etching, and
the first residual photoresist feature defines a closed shape having a perimeter, and,
after the developing step and before the etching step, no portion of the wafer surface is
exposed within the perimeter.

55. (Withdrawn) The method of claim 54 wherein the shortest dimension of the photoresist feature measured in the plane of the wafer surface is no greater than about 150 nm.
56. (Withdrawn) The method of claim 55 further comprising forming a plurality of residual photoresist features,
wherein each photoresist feature of the plurality is exposed to light in the first phase, and
each photoresist feature of the plurality is entirely surrounded by the second wafer area.
57. (Withdrawn) The method of claim 56 wherein each of the plurality of photoresist features defines a closed shape having a perimeter, and, after the developing step and before the etching step, no portion of the wafer surface is exposed within the perimeter.
58. (Withdrawn) The method of claim 57 wherein the plurality of photoresist features is uniformly spaced.
59. (Withdrawn) The method of claim 57 wherein the plurality of photoresist features is randomly spaced.
60. (Withdrawn) The method of claim 57 wherein a patterned feature is formed on the wafer surface from each of the plurality of photoresist features, and wherein the patterned features are portions of memory cells forming a first memory level in a memory array, the first memory level formed at a first height above a substrate.
61. (Withdrawn) The method of claim 60 wherein the memory array is a monolithic three dimensional memory array, the array further comprising at least a second memory level

formed at a second height above the substrate, the second height different from the first height.

62. (Withdrawn) A method for forming photoresist features on a wafer surface using a photomask, the method comprising:

transmitting light through a first mask area onto a first wafer area, the first mask area having a first shifting degree;

transmitting light through a second mask area onto a second wafer area, the second mask area having a second shifting degree,

wherein the second mask area entirely surrounds and is on all sides in contact with the first mask area, and the first shifting degree is substantially opposite the second shifting degree; and

developing photoresist, wherein, after the developing step, a closed residual photoresist feature remains between the first wafer area and the second wafer area, and wherein the closed residual photoresist feature is isolated and not merged with any adjacent photoresist feature.

63. (Withdrawn) The method of claim 62 wherein the first shifting degree is about zero degrees and the second shifting degree is about 180 degrees.

64. (Withdrawn) The method of claim 63 wherein, after the developing step, no wafer surface is exposed within the first wafer area.

65. (Withdrawn) The method of claim 62 wherein the first shifting degree is about 180 degrees and the second shifting degree is about zero degrees.

66. (Withdrawn) The method of claim 65 wherein, after the developing step, no wafer surface is exposed within the first wafer area.

67. (Withdrawn) A monolithic three dimensional memory array comprising:

a plurality of patterned features, the plurality of patterned features patterned using a photomask comprising:

a plurality of spatially separate first transmitting windows, wherein the transmitting windows transmit light in a first phase; and

a transmitting area of the photomask, each transmitting window substantially surrounded by and in contact with the transmitting area,

wherein the transmitting area transmits light in a second phase, the second phase substantially opposite the first phase.

68. (Withdrawn) The monolithic three dimensional memory array of claim 67, wherein the patterned features comprise substantially coplanar pillars.

69. (Withdrawn) The monolithic three dimensional memory array of claim 68 wherein the pillars have a diameter no more than about 150 nm.

70. (New) A method for patterning pillars, the method comprising:

a) projecting light onto photoresist using a photomask, the photomask comprising:

a plurality of transmitting nonprinting windows transmitting light in a first phase;

a transmitting area transmitting light in a second phase, each transmitting window of the plurality substantially entirely surrounded by and in contact with the transmitting area with no blocking material intervening,

wherein the second phase is substantially opposite the first phase, and

wherein a first width of unbroken transmitting area surrounds each transmitting window of the plurality on all sides, the first width sufficient for the unbroken transmitting area to print when the photomask is used to expose photoresist; and

b) developing the photoresist to form a plurality of photoresist features, wherein the photoresist features of the plurality are photoresist pillars.

71. (New) The method of claim 70 wherein the first phase is about 180 degrees and the second phase is about 0 degrees.

72. (New) The method of claim 70 wherein the first phase is about 0 degrees and the second phase is about 180 degrees.
73. (New) The method of claim 70 wherein the shortest dimension of any of the plurality of nonprinting transmitting windows parallel to the plane of the photomask is no more than about 160 nm x S.
74. (New) The method of claim 70 wherein the shortest dimension of any of the plurality of nonprinting transmitting windows parallel to the plane of the photomask is no more than about 120 nm x S.
75. (New) The method of claim 70 wherein each of the plurality of transmitting windows is rectangular.
76. (New) The method of claim 70 further comprising etching to form a plurality of patterned pillars from the photoresist pillars.
77. (New) The method of claim 76 wherein each of the plurality of patterned pillars comprises polysilicon.
78. (New) The method of claim 76 wherein each of the plurality of patterned pillars is a portion of a memory cell.